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FISHES OF THE FAMILY PERCOPHIDIDAE FROM THE COASTS OF EASTERN UNITED STATES AND THE WEST INDIES, WITH DESCRIPTIONS OF FOUR NEW SPECIES

By Isaac Ginsburg

Fishes of the family Percophididae from the coasts of eastern United States and the West Indies have, to my knowledge, hitherto been recorded under one name, (*Hypsicometes*) *Bembrops gobioides* (Goode). Four new species are added here, making a total of five species divided into two genera. Specimens of all five species have been preserved in the collection of the U. S. National Museum for some time, where they have been cataloged as *gobioides*. Adequate samples of two species that appear to be common offshore in the Gulf of Mexico have been collected during recent years by the U. S. Fish and Wildlife research boats *Pelican* and *Oregon*. This added material made it possible to determine and distinguish these two species satisfactorily and aided in the proper distinction of the other species. Three of the four new species were obtained by the *Caroline* of the Johnson-Smithsonian Expedition. Specimens of two of the latter species were also collected by the *Albatross*, 68 and 69 years ago; they were identified as *gobioides* by Goode and Bean and were included in their account of that species as noted below.

Family Percophididae

Characters common to the five species here treated: Notably elongate, slender. Head and anterior part of body depressed, the width in relation to the depth gradually decreasing from head backward, becoming somewhat compressed at caudal peduncle; ventral aspect flat, especially anteriorly, forming a nearly horizontal plane. Snout notably depressed, flat, broad, rounded anteriorly, somewhat ducklike. Hard part of upper jaw with a narrow emargination on upper surface at symphysis, producing a bilobate effect on a dorsal view, the small space between the lobes more or less bridged with a yellowish, moderately soft tissue. Nostrils small or moderate; one behind the other on a horizontal approximately through upper margin of pupil, at some distance in front of eye; close to each other or rather widely spaced, depending on the genus; anterior one with a slightly raised rim; posterior one with a well raised, somewhat tubular rim, hind part of tubule higher. A lengthwise mucous channel dorsad of the nostrils, opening by two pores of variable size, one at its anterior end not far from upper jaw, the other at some distance from its posterior end, near posterior nostril. Mouth rather large, nearly horizontal, superior, lower jaw extending beyond upper. Eyes large, interorbital narrow. Mandibular rami notably expanded, placed in a ventral position. Maxillary reaching to under posterior margin of pupil or a little behind. Teeth in bands on jaws, vomer, and palatines, the band in upper jaw broadening at symphysis; some inner teeth of vomer, of palatines, and at symphysis of upper jaw moderately enlarged in some species. Gill cover having its posterior and greater part thin and flexible, somewhat tapering and prolonged posteriorly, its upper margin horizontal and free for a considerable distance, its lower margin sharply oblique, running upward and backward; with three moderate spinous points, the upper spine close to upper margin, the middle spine moderately spaced, the two forming apical points of two moderate or slight ridges converging forward, the lower spine widely separated, placed at lower margin of gill cover and constituting part of subopercle. Preopercle with one to three spinous points at angle present or absent (subject to individual variability). Gill opening wide, branchiostegal membranes overlapping under anterior margin of eye or a little more forward. Gill rakers in moderate numbers or rather numerous. Pseudobranchiae well developed. Scaled nearly all over, including head, chest, fleshy pectoral base, and mandibular rami; snout scaled posteriorly, incompletely scaled to nearly scaleless anteriorly; anterior space between mandibular rami scaleless except in *Chriomystax squamentum;* pelvic and pectoral fins scaled on a small

area near base, scaleless in larger part; caudal scaled on a larger area near base; dorsal and anal scaleless; scales on sides of body moderately ctenoid, others cycloid, at least in large part. (The scalation is incomplete or nearly all missing in almost all specimens examined and not all details are accurately determinable; consequently, the above statements might be subject to a moderate revision.) Lateral line beginning at upper angle of gill opening, running horizontally over upper margin of opercle, curving directly behind head, except in individual variants of *Bembrops anatirostris* (p. 636), and dipping rather sharply down, posterior end of curve approximately at end of pectoral, thence running nearly straight backward and nearer to lower than upper profile. First dorsal with six flexible spines (the count constant as determined in 124 specimens of all five species). Second dorsal with 14–18 rays, all segmented; anal similar to second dorsal, with 17–19 segmented rays; the rays in the two fins notably well spaced. Pelvic horizontally placed on ventral aspect of abdomen, its base well in advance of pectoral, approximately under preopercular margin, its end falling considerably short of anus; with one flexible spine rather well developed and five segmented rays. Pectoral extending moderately behind a vertical through anal origin, with 22–28 rays. (Caudal damaged in nearly all specimens examined; seems to be moderately emarginate with the rays near the upper margin somewhat longer than the corresponding lower rays.)

Methods of study: The dorsal and anal fins are very often damaged, many of the rays being broken off, leaving only a short stump. However, the rays are widely separated and readily countable even when damaged and in the small specimens. The last ray is split to its base and the two branches have been counted as one ray.

The scales are deciduous and most or nearly all of them are missing in almost all specimens examined. However, when the scales are missing their pockets are prominently outlined. The counts of the scales here given generally refer to the number of oblique rows of scale pockets, beginning with the row that is wholly or partly behind the short, rather sharp spine at the upper anterior angle of the gill opening and ending at the caudal base. Some of the counts here recorded may be off by one or two scales, especially for specimens on which part of the count was made of the rows of actual scales and part of the rows of pockets, or in case of specimens having the rows somewhat irregular in places. But, on the whole, the counts made closely approach the true numbers.

The gill raker standing squarely within the angle of the arch is the longest, and it has one "root" on the upper limb and one on the lower. Following my usual procedure, it has been uniformly included in the count of the lower limb. The tuberclelike outgrowths at both ends

of the arch, when present, have been included in the gill raker count as discussed under *Bembrops*.

The given length of the pectoral fin and the pelvic fin is that of the longest ray, from its point of articulation; that of the caudal from end of hypural to tip of longest ray, which is located at upper margin of the fin. The depth was measured at the origin of the first dorsal. The measurement of the "peduncle" refers to the least depth of the caudal peduncle. The head was measured from the apex of the lobe on the snout (not the middle anterior point) to the posterior margin of the flexible opercle. The snout was measured from the same anterior point as the head to the anterior soft margin of the eye. The eye measurement represents the horizontal distance between its soft margins. Numerical values of proportional measurements are expressed as a percentage of the standard length unless otherwise stated.

Specimens examined: This study is based chiefly on the western Atlantic specimens of this family in the collection of the U. S. National Museum and the museum catalog numbers are given under the accounts of the species. In addition, the types of *Chrionema chryseres* and *C. squamiceps* that Gilbert described from off Hawaii have been examined for comparative purposes as discussed below. Also, single specimens of four other species of the genus *Bembrops* from the Pacific and Indian Oceans were examined and some of their characters are discussed under the account of that genus.

Brazilian species: Two percophidid species are known from the coast of Brazil, from which the marine fish fauna has much in common with the regions here considered. One species, *Percophis brasiliensis* Quoy and Gaimard, a notably long and slender fish, is readily distinguishable by its much more numerous fin rays (D IX; 31. A 41 in one specimen, USNM 77325) and other well marked characters. The other species, *Hypsicometes heterurus* Miranda Ribeiro (1915, pls.), of which no specimens are available for examination, is described as having the following combination of characters: D VI; 14. A 17. P 25; lateral line about 59; eye 1½ times in snout. The combination of the given counts is close to that of the species here designated as *Bembrops macromma*, but the eye is smaller than in that species. Miranda Ribeiro's photograph shows that the anterior straight part of the lateral line extends for some distance behind the head, which, except in individual variants of *B. anatirostris*, is different than in the specimens examined of the species treated here.

Nomenclature: The question of what family name to apply to the two genera here considered is one of biology rather than of mere nomenclature. The problem is how the genera *Bembrops*, *Chriomystax*, and their near relatives are to be classified into families and how

to determine the proper limits between the families. The two genera mentioned fall into the larger groups that Regan designates as Trachiniformes and Jordan as Percophidiformes.

Regan (1913, pp. 140–144), subdivides his "Division 10. Trachiniformes," which is a subordinate category in his "Suborder Percoidea" and apparently roughly corresponds to the superfamily category of other taxonomists, into 13 families, 9 of which contain only 1–3 genera each. However, such splitting of the relatively few, seemingly more or less related genera into an excessive number of families is not based on an adequate comparative study of their morphology; at least such a study is not included in the published record. After an examination of the external characters of a number of the genera concerned, it seems that Regan's family category as applied to these fishes is equivalent to the category designated as subfamily or even tribe by other modern taxonomists, or, in other groups, by Regan himself.

A classification published later by Jordan (1923, pp. 228–231) agrees in the main with that of Regan. Jordan likewise divides these genera among many families. But the two classifications differ in some particulars, two of which may be mentioned here: Jordan also groups the families into a next higher category which he calls "Series" that corresponds roughly with Regan's "Division," but the families that Regan includes in his Trachiniformes are placed by Jordan in four "Series;" and, in some instances, Jordan shuffles the genera from one family to another so that the content of some families is different from that of Regan. These differences cast some doubt on the adequacy of both classifications.

The genera that are of immediate concern in this paper are placed in three families in both classifications, but the genera are differently distributed and the two authors use different names for one of the families. Both recognize the family Percophididae with one genus, although Regan does not expressly state so. Besides that family, Regan recognizes the Bembropsidae with two genera, *Bembrops* and *Chrionema*, and the Hemerocoetidae with *Hemerocoetes* and *Acanthaphritis*. He also indicates that *Pterosaron* Jordan and Snyder is the same as *Acanthaphritis* Gunther. This suggested synonymy is open to question.

In Jordan's classification, the Hemerocoetidae includes only the type genus; while the third family, which is designated Pterosaridae instead of Bembropsidae, contains *Bembrops*, *Chrionema*, *Acanthaphritis*, *Pterosaron*, and *Osopsaron*. The last-named genus is possibly the same as *Acanthaphritis*, while the other two genera placed by Jordan in his Pterosaridae, *Hypsicometes* Goode and *Bathypercis* Alcock, are presumably synonyms of *Bembrops*.

The six or seven genera discussed above, which evidently are of close relationship, are placed in three families and the content of two of these families differs in the two classifications. If this process of splitting the families is carried to its logical conclusion, four families should be recognized for the following four diverging groups of genera: *Percophis*, *Bembrops* and *Chrionema*, *Acanthaphritis* and *Pterosaron*, and *Hemerocoetes*. Such excessive splintering of the families seems out of line with family divisions in other groups of fishes and in zoology in general and serves no useful purpose. Therefore, it would seem best to place all these genera in one family. At any rate, the terminology used in this paper is in line with this viewpoint. Perhaps other related genera should be included in the Percophididae.

Key to five Western Atlantic percophidid species

1*a*. Maxillary without a tentacle. Anterior part of space between mandibular rami scaled. Caudal without a definite spot behind its base. Gill rakers 7–9+20–21, those at the ends slender, moderately developed. Pectoral rays 21–22. Dorsal rays usually 15, sometimes 16. Scales 55–61.
Chriomystax squamentum (p. 629)

1*b*. Maxillary with a broad tapering tentacle. Space between mandibular rami scaleless. The smaller specimens with a caudal spot disappearing with growth (unknown for *macromma*). Gill rakers 4–6+14–16, including 1–4 at both ends of arch in form of low tubercles.

2*a*. Scales 47. Pectoral rays 24. Dorsal rays 15. Eye larger than snout.
Bembrops magnisquamis (p. 633)

2*b*. Scales 55–59. Pectoral rays 25. Dorsal rays 14. Eye subequal to snout, varying slightly both ways (well divergent in this character from *anatirostris* and approaching *gobioides*, see table 4). Without a prolonged dorsal spine in three males examined (185–202 mm.). A lateral series of four spots . . . . . **Bembrops macromma** (p. 634)

2*c*. Scales 61–71. Pectoral rays 26–28. Eye smaller than snout.

3*a*. Dorsal rays usually 15, sometimes 14. The larger males having the second dorsal spine filamentous. With a lateral row of about 10 spots better marked in the smaller specimens.
Bembrops anatirostris (p. 635)

3*b*. Dorsal rays usually 17, sometimes 18. Without a filamentous dorsal spine. Without a definite lateral row of spots.
Bembrops gobioides (p. 637)

Chriomystax, new genus

GENOTYPE: *Chriomystax squamentum*, new species.

COMPARISON: *Chriomystax* agrees with *Chrionema* Gilbert (genotype *Chrionema chryseres* Gilbert (1905, p. 645) by original designation) in lacking a maxillary tentacle, the presence of which is a constant feature of *Bembrops*. *Chriomystax* differs from *Chrionema* in having the ventral aspect of the head, that is, the mandibular rami and the space between them, scaled instead of naked. (In the species of

Bembrops examined the mandibular rami are more or less scaled, but the area between them is naked.) *Chriomystax* further differs in having 18 anal rays, instead of 24 as in *Chrionema chryseres*. The latter character ordinarily, in fishes in general, would not be deemed of generic importance. However, in the species of the two genera here treated the number of anal rays varies intraspecifically and differs interspecifically within comparatively narrow limits. In eight species of *Bembrops* and two of *Chriomystax* the total range is 16–19 (see table 1 and the counts of extralimital species, p. 632). Consequently, it seems that in this family this difference sometimes indicates a higher degree of divergence than that of species.

Chrionema chryseres, the type species of its genus, differs in three other characters: The gill rakers are fewer and those at both ends of the arch are much reduced, in the form of low tubercles, while in the two species of *Chriomystax* in addition to being more numerous in total count, those at the ends of the arch are slenderer and longer, not in the form of tubercles; the bands of teeth are conspicuously wider in *C. chryseres;* and it is a much rougher fish, the scales being more strongly ctenoid. However, any one or all three of these differences might possibly be governed by growth, the single available specimen of *C. chryseres* being considerably larger, 181 mm. in standard length, while the two species of *Chriomystax* examined are 29–55 mm. in the same length.

In the original account of his *Chrionema*, Gilbert (1905, pp. 645–646) included two species—*chryseres*, the genotype, and *squamiceps*. The latter species is near *Chriomystax squamentum* in its structural characters and should be placed in the same genus with it. The differences between these two congeneric species are discussed below.

Chriomystax squamentum, new species

Description: D VI; 15–16. A 18. P 21–22. Sc 55–61. GR 7–9+20–21. Dorsal rays usually 15, sometimes 16. Anal rays constantly 18. Pectoral rays 21–22. (The uppermost pectoral ray has a slight ridge along its upper aspect that may be separated cleanly when some pressure is applied to it with a dissecting needle, and it then appears like a very thin distinct ray. However, the ridge does not seem to be separated basally from the ray. It apparently does not represent a separate ray and was not included in the count of the pectoral rays.) Gill rakers at both attached ends of the outer arch slender, graduated, not in the form of short stumpy tubercles, except one short gill raker, abruptly shorter than the others, intermediate in development between a gill raker and a tubercle, occasionally present at either end of the arch; gill rakers, including the short one when present, 7–9+20–21 or 27–30 in total number on both limbs. Anterior

area between mandibular rami covered with imbricated cycloid scales. Posterior pore of lengthwise mucous channel on snout placed between the two rather widely separated nostrils.

Measurements of two specimens, including the holotype, 53.2–55.3 mm. in standard length, the caudal and pectorals damaged: pelvic 20.0–21.5, depth 14.3–14.7, peduncle 5.2–5.6, head 36.0–36.5, maxillary 13.4–13.9, snout 9.4–10.0, eye 11.8–12.7; snout 0.71–0.74 as long as eye.

Body with a lengthwise, nearly median row of eight rather diffuse spots, the first a little behind pectoral base, the last at caudal base; the second spot largest and most prominent, rounded, elongate with

TABLE 1.—*Frequency distribution of the number of dorsal, anal, and pectoral rays in five Western Atlantic percophidid species*

Species	Dorsal rays					Anal rays			Pectoral rays							
	14	15	16	17	18	17	18	19	21	22	23	24	25	26	27	28
Chriomystax squamentum		25	3				28		17	11						
Bembrops magnisquamis		2				2						2				
B. macromma	3						3						3			
B. anatirostris	4	37				8	33							7	30	4
B. gobioides				49	2	2	45	4						6	36	8

its longer axis longitudinal, centered approximately over anal origin; some irregular smudges over median row, very diffuse; two diffuse smudges on caudal, at its base, at upper and lower margin; no well marked spot on caudal at some distance behind its base and no other prominent markings.

In small specimens, every spot in the median row is made up of very small, black, somewhat stellate spots. Another row of small, rounded, rather crowded, almost solidly bluish black spots above the median row, every spot with many very fine radiating lines, presenting a stellate appearance in gross effect. Two rows of similar but somewhat smaller spots below the median row. The two spots on caudal, at its base, likewise in form of two groups of very small spots, the groups somewhat confluent. The juvenile color pattern is present in specimens about 29–32 mm. in standard length, while the pattern of the larger specimens is described above from specimens 30–55 mm. in the same length.

HOLOTYPE: USNM 108394. *Caroline* Sta. 102; lat. 18°51′ N., long. 64°33′ W.; off Virgin Islands, 140 fathoms; Mar. 4, 1933; 53.2 mm. in standard length.

PARATYPES: 27 specimens, 29.3–55.3 mm. in standard length, taken at same station as holotype; the caudal damaged in all specimens (USNM 108393, 108396).

COMPARISON: This species is near (*Chrionema*) *Chriomystax squamiceps* (Gilbert, 1905) from Hawaii, agreeing with it in its structural characters, including the presence of scales between the mandibular rami. The holotype of *squamiceps* was examined and its counts are as follows: D VI; 16. A 18. P 23. Sc 66. GR 7+20. Therefore, the Atlantic species here described differs in having fewer scales and pectoral rays. Possibly it will also prove to average fewer dorsal rays.

ETYMOLOGY: The name *squamentum* is a contracted form of squamimentum (scaled chin).

Genus *Bembrops* Steindachner

Bembrops Steindachner, Icthyologische Beiträge, (V) p. 163, 1876 (genotype *Bembrops caudimacula* Steindachner, by monotypy).

Hypsicometes Goode, Proc. U. S. Nat. Mus., vol. 3, p. 347, 1880 (genotype *Hypsicometes gobioides* Goode, by monotypy).

DESCRIPTION: Maxillary with a broad tentacle at its end, of moderate length, its base nearly as wide as maxillary, tapering. Space between mandibular rami scaleless. The smaller specimens having a spot on the caudal near its base, nearer to upper than lower margin, disappearing with growth (not determined for *macromma*). The two nostrils rather close together, as compared with *C. squamentum*.

TABLE 2.—*Frequency distribution of the number of oblique rows of scales over lateral line in five Western Atlantic percophidid species*

Species	Scales																	
	47		55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71
Chriomystax squamentum			2	3	6	3	1	1	2										
Bembrops magnisquamis	1																		
B. macromma			1			1	1												
B. anatirostris									2	5	3	5	8	13	3		1		
B. gobioides										1	5	7	9	11	8	3	3	1	1

Posterior pore of lengthwise mucous channel on snout close to and slightly dorsad of posterior nostril.

The gill rakers in *macromma*, *anatirostris*, and *gobioides* are as follows. The upper limb of the outer gill arch has two graduated gill rakers at the angle and usually two tuberclelike outgrowths at the attached end. One outgrowth in between varies in its development. At one extreme it can be classed with the tubercles and at the other it may be taken to represent a short gill raker; and it occurs in all degrees of development in between the extremes. On the lower limb the gill rakers decrease in length from the one on the angle

(here included in the count of the lower limb) forward. At the attached end 1–4 tubercles occur that are similar to those of the upper limb, and the outgrowth behind the tubercles varies in development in a similar manner as the corresponding one on the upper limb. As the number of tubercles is readily determinable and no sharp line can be drawn between them and the gill rakers, all are included in one count in this comparative study.

In one small specimen each of *anatirostris* and *gobioides*, 58 and 43.5 mm. standard length, respectively, the gill rakers near both ends of the arch are relatively better developed and sharply delimitable from the two tubercles at both ends. Therefore, the relative development of the gill rakers as compared with the tubercles appears to change with growth, in these two species anyway.

Development in the two available specimens of *magnisquamis* (p. 633) is somewhat different than in *macromma*, *anatirostris*, and *gobioides*. Although an adequate sample is not available to determine growth

TABLE 3.—*Frequency distribution of the number of gill rakers, including tubercles, in five Western Atlantic percophidid species*

Species	Upper limb						Lower limb						Total both limbs							
	4	5	6	7	8	9	14	15	16		20	21	18	19	20	21		27	28	29	30
Chriomystax squamentum				10	4	1					8	7						6	6	2	1
Bembrops magnisquamis	1	1					2						1	1							
B. macromma		3					3							3							
B. anatirostris	1	39	1				4	31	6				1	3	30	7					
B. gobioides	3	48					13	29	9				2	12	28	9					

changes satisfactorily, it seems that in the latter three species the anterior gill rakers are not in the form of tubercles in small fish, and one at both ends changes to a tubercle with growth.

EXTRALIMITAL SPECIMENS EXAMINED: Counts of four extralimital specimens in the U. S. National Museum, examined for comparative purposes, are as follows. Taken off Kagoshima, Japan, now labeled as *Bembrops maculicauda* (59647, 134 mm.): D VI; 14. A 16. P 24. Sc 52. GR 4+13. Holotype of *B. filifera* Gilbert from off Hawaii (51613): D VI; 14. A 18. P 27. Sc 63. GR 4+15. Holotype of *B. filifer* Fowler from east of Masbate Island, Philippines (98866): D VI; 14. A 16. P 28. Sc 51. GR 5+14. Paratype of *B. nematopterus* Norman from off Zanzibar (109489): D VI; 14. A 16. P 25. SC 47. GR 5+15. While it is necessary to study adequate samples to determine the intraspecific variability of these species, the combinations of the foregoing counts

as compared with those of the five Western Atlantic species given in tables 1–3 show that the extralimital species examined are different. Also, in three of these species, excluding *caudimacula*, the first spine is filamentous and prolonged, while among the Atlantic species only *anatirostris* is now known to have a prolonged dorsal spine, and in that species it is the second instead of the first spine that is prolonged in large males.

***Bembrops magnisquamis*, new species**

DESCRIPTION.—D VI; 15. A 17. P 24. Sc 47. GR 4–5+14. Fin ray counts the same in both available specimens. Scales in 47 rows over lateral line in holotype; some scales missing in paratype and number not definitely determinable, but approximately the same. Anterior gill rakers in the smaller specimen (paratype) short, slender,

TABLE 4.—*Frequency distribution of the numerical value of the measurement of the snout divided by that of the eye in three Western Atlantic species of* Bembrops, *segregated in size groups*

Species	*Standard length in mm.*	*Ratio*							
		0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6
anatirostris	58–115			1	3	2			
gobioides	81	1							
anatirostris	117–146				2	1	2		
gobioides	123–145			3					
macromma	154–168	1	1	1					
anatirostris	154–180					3	3		
gobioides	162–181				5	2			
anatirostris	186–221					1	8	5	
gobioides	183–224			8	21	8			
anatirostris	231–271					1	4	4	1

graduated, not tuberclelike; in larger specimen end outgrowth on upper limb a low tubercle, anteriormost one on lower limb intermediate in development.

Following are the proportional measurements of the holotype and paratype, respectively (caudal, pectoral, and pelvic damaged in both specimens): Depth 14.5, 13.5; peduncle 6.3, 6.0; head 36, 34; maxillary 14.5, 13.3; snout 10.2, 8.9; eye 10.5, 9.6.

First dorsal with a large subtriangular black spot at its base extending from first interspinal membrane to fifth spine, a whitish area above spot, anterior produced part above whitish area again black; a similar smaller black spot at base of second dorsal from first interradial membrane to third ray; in gross effect the two spots appearing partly

ocellated above (described from the holotype). The specimen appears to be now largely faded, but the following marks are more or less faintly evident: A dusky transverse bar on upper half of caudal at its base; a better marked spot on midline below bar; an elongate narrow, short, dusky band behind the transverse bar in the approximate position of the caudal spot usually present in the smaller specimens of the species of *Bembrops;* three short elongate bands on middorsal line in front of first dorsal; anal with blackish margin. The paratype has the spot on the first dorsal reduced, the transverse bar on the caudal very faint, and a few black scattered points on peduncle; otherwise it seems faded.

HOLOTYPE: USNM 45985. *Albatross* Sta. 2134; lat. 19°56′06″ N., long. 75°47′32″ W.; off Santiago, Cuba; 254 fathoms; Feb. 27, 1884; 85.5 mm. in standard length.

PARATYPE: *Caroline* Sta. 99; lat. 18°14′ N., long. 64°51′ W.; 220 fathoms; off Virgin Islands, Mar. 3, 1933; 50 mm. in standard length (USNM 108395).

COMPARISON: This species is easily distinguishable from the other four Western Atlantic species treated here by its large scales. The predominant number of anal rays in the other four species is decidedly 18, while in the two available specimens of this species the number is 17. It has, or at least averages, fewer pectoral rays than the three Western Atlantic species of *Bembrops.* The gill raker count averages rather low, comparatively.

Bembrops macromma, new species

DESCRIPTION: D VI; 14. A 18. P 25. Sc 55–59. GR 5+14. Dorsal, anal, and pectoral rays and combined number of gill rakers and tubercles constant in the three specimens examined.

Measurements of three specimens 185–202 mm. (154–169 mm. in standard length): Caudal 20.0–21.5, pectoral 23.5–24.5, ventral 17.0–18.5, depth 13.8–14.8, peduncle 5.5–6.2, head 37.5–38.5, maxillary 14.6–14.9, snout 10.5–11.1, eye 10.6–11.3; ratio of snout divided by eye 0.9–1.1.

A series of three large, diffuse, dusky spots, equally spaced, the first over anus, the third under end of dorsal fin; the first placed just below lateral line, the other two just above it; each of the two interspaces between the spots with two rather faint transverse dusky bands more or less developed; a fainter and smaller spot on caudal peduncle at base of caudal fin in a line with the above three somewhat more prominent spots; three faint smudges at dorsal profile over interspaces of the four median spots; anterior part of the first dorsal to the third spine black for entire height of fin, posterior part abruptly

light, without pigment (in one specimen a small black spot at base of fin behind third spine); anal whitish, broadly margined with black; other fins more or less dusky, especially distally.

HOLOTYPE: USNM 108392. *Caroline* Sta. 81; lat. 18°35′30″ N., long. 65°23′54″ W.; off Virgin Islands, 300 fathoms; Feb. 26, 1933; 186 mm., 154 mm. in standard length.

PARATYPES: *Caroline* Sta. 100; lat. 18°40′15″ N., long. 64°50′15″ W., off Virgin Islands, 150 fathoms; Mar. 4, 1933; 2 specimens, 185–202 mm. (USNM 108391).

COMPARISON: In general appearance, as compared with *anatirostris* and *gobioides*, this species seems to be a somewhat more compact fish, not as slender as its two near congeners, with a shorter snout, larger eye and somewhat different color pattern. Differences in the proportional measurements of the depth of the body and caudal peduncle do not show up well even in the few specimens measured (compare accounts of the species). As the eye is larger and the snout shorter, at least on the average, in this species than in the other two, the numerical value of the ratio of the snout divided by the eye for all three species is given in table 4. When specimens of approximately like size are compared (table 4), *macromma* differs from both species, the extent of divergence being greater when compared with *anatirostris*. This species has lower counts of scales and pectoral and dorsal rays, at least on the average, than the other two species (tables 1, 2). In the number of dorsal rays it intergrades with *anatirostris*, but is well distinguished from *gobioides*. Taking all the marked structural differences and the color pattern into consideration, it is not difficult to distinguish *macromma* from *anatirostris* and *gobioides*. Its distinction from the other two Western Atlantic percophidid species is indicated under their accounts. It is compared with *Hypsicometes heterurus* Miranda Ribeiro on page 626.

Bembrops anatirostris, new species

Description: D VI; 14–15. A 17–18. P 26–28. Sc 61–69. GR 4–6+14–16. Dorsal and anal rays usually 15 and 18, often 14 and 17, respectively. Pectoral rays with the mode at 27, varying 26–28. Gill rakers, including the 1–4 tubercles at both ends of the arch, nearly always 5 on upper limb, infrequently 4 or 6, modally 15, varying 14–16 on lower limb; usually 20 in combined number on both limbs, varying 18–21. The larger males having the second dorsal spine filamentous, considerably prolonged, reaching base of second dorsal ray in one male 177 mm., base of fourth to sixth ray in six males 195–250 mm., base of sixth to ninth ray in six males 250–315 mm., not prolonged in 7 males 185 mm. or less. (This development is not

present in *B. gobioides*, of which a good composite sample was examined. It is also not present in the specimens examined of the other three percophidid species treated here, but the available samples are not adequate for a final determination of this point in the latter species.) Lateral line sloping downward directly behind posterior margin of head or continued horizontally and beginning to slope at some distance behind head (only species having variants showing the latter conditions, both variations sometimes shown on the two sides of the same specimen).

Measurements of five specimens 241–261 mm. in standard length and five specimens 142–167 mm. in same length, the latter in parentheses: Caudal 19.5 in 1 (22 in 1), pectoral 21.0–22.5 (22.0–23.5),

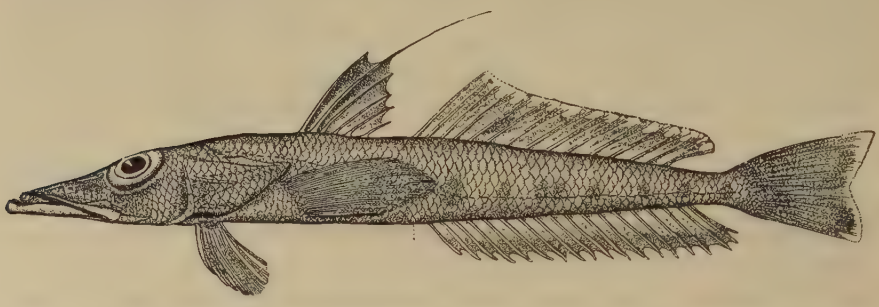

FIGURE 120.—*Bembrops anatirostris*, from a paratype (USNM 157735) 261 mm. in standard length, about 315 mm. long, from off Cape San Blas, Fla. (Drawn by Mildred H. Carrington.)

pelvic 14.2–15.7 (15.1–16.2), depth 12.7–14.2 (12.8–14.7), peduncle 5.0–5.8 (5.0–5.7), head 38.5–41.5 (36–37), maxillary 14.2–16.0 (14.2–14.6), snout 12.5–13.2 (11.3–12.2), eye 8.1–9.7 (8.4–8.9). The ratio of the eye in the snout is shown in table 4.

With a lengthwise, somewhat irregular row of about 10 diffuse irregular spots running along lateral line and continued forward under its anterior arch; the spots of various sizes and shapes and irregularly spaced, some of them doubled; fleshy pectoral base and anterior part of opercle with a silvery wash; anal whitish with a supramarginal blackish band; other fins more or less dusky, the pigment somewhat better developed distally; filament of second dorsal spine in male black.

HOLOTYPE: USNM 155470. *Pelican* Sta. 9; lat. 29°02′ N., long. 88°45′30″ W.; east of the Mississippi Delta; 170 fathoms; male 235 mm. in standard length, the caudal damaged, approximately 284 mm. long.

PARATYPES: 11 specimens 117–245 mm. in standard length obtained with the holotype (USNM 155471). Also, 29 specimens 58–271 mm.

in standard length, approximately 71–327, mm. long, obtained in 60–200 fathoms by the *Oregon*, the *Caroline*, and the *Albatross* off the following localities: Tampa (USNM 157734), Cape San Blas (USNM 44609, 157735, 157738) and Pensacola (USNM 157736–7, 157739–40), Fla.; Chandeleur Islands, La. (USNM 45976); Mississippi Delta (USNM 157733); Puerto Rico (USNM 117867–8).

Comparison: This species is near *gobioides*. The chief character that proves the distinctness of the two species and the one that is most useful in separating them refers to the number of dorsal rays, usually 15 or 17, sometimes 14 or 18, in *anatirostris* and *gobioides*, respectively (table 1). This difference seems to be absolute, as in 92 specimens of both species examined not one had 16 rays. This species also differs from *gobioides* in having the second dorsal spine of large males filamentous and in the presence of a lateral row of spots. On the average, the snout is longer and the eye smaller in *anatirostris*. The two species diverge considerably in the numerical value of the ratio of the eye in the snout (table 4) when specimens of approximately like size are compared, but they intergrade in this character.

Populations: The two specimens from Puerto Rico examined have the gill raker count near the upper limit of the range of distribution of the rest of the specimens, which were taken on the coast of the United States, while that of the scale count is near the lower limit of the range of the United States specimens, namely, GR 5+16, Sc 62, in both specimens from Puerto Rico. The counts of these two specimens are included in tables 2 and 3.

Bembrops gobioides (Goode)

Hypsicometes gobioides Goode, Proc. U. S. Nat. Mus., vol. 3, p. 348, 1880 (off Long Island, N. Y.).—Goode and Bean (in part), Oceanic ichthyology, p. 290, pl. 74, figs. 263–263a, 1895 (specimens of at least three species included in this account; those from *Albatross* Sta. 2378 and 2402 included in account of *anatirostris* (p. 635); specimen from Sta. 2134 designated as holotype of *magnisquamis* (p. 633); other specimens are included below in account of *gobioides;* some of the listed specimens not now available for examination).

Bembrops gobioides Longley, Carnegie Inst. Washington Publ. 535, p. 237, 1941 (Tortugas, Fla.).

Description: D VI; 17–18. A 17–19. P 26–28. Sc 62–71. GR 4–5 + 14–16. Dorsal rays most predominantly 17, rather infrequently 18. Anal rays with the mode decidedly at 18, sometimes 17 or 19. Pectoral rays modally 27, varying 26–28. Gill rakers, including tubercles, on upper limb predominantly 5, sometimes 4; on lower limb modally 15, varying 14–16; total on both limbs modally 20, varying 18–21.

Measurements of four specimens 162–176 mm. in standard length, approximately 191–208 mm.: Caudal 18–19 (in two), pectoral 23.5–24.5, pelvic 15.2–16.7, depth 11.2–14.1, peduncle 4.9–5.6, head 33.5–37.0, maxillary 13.1–14.9, snout 10.5–11.9, eye 8.6–10.2. Ratio of eye in snout given in table 4.

Nearly all available specimens have almost all scales on body missing and normal color pattern not evident. They have a dark reticulate

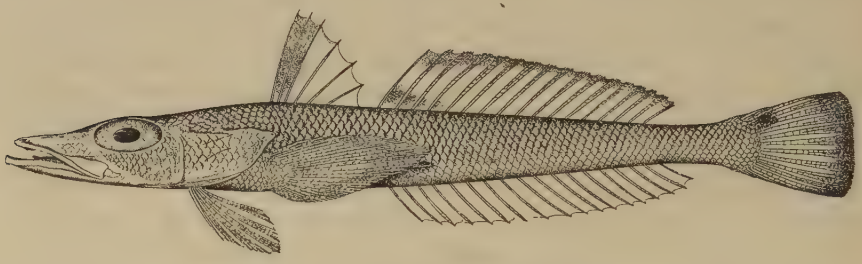

FIGURE 121.—*Bembrops gobioides*, from Goode and Bean, from a specimen (USNM 44233) taken off the Mississippi Delta. Caudal fin damaged in specimen figured; normally, caudal somewhat emarginate with the upper rays slightly longer than lower. Caudal spot disappears in large specimens.

pattern made up of the prominent outlines of the scale pockets. Some specimens show two or three faint dusky smudges along lateral line. First dorsal usually black or dusky for its anterior upper and greater part, hyaline basally and posteriorly, often dark nearly all over; second dorsal moderately dusky margined with blackish and a basal blackish area at its anterior part; anal moderately dusky, rather narrowly margined with black, often dusky or black nearly all over; caudal dusky, usually with a rather wide black area at its distal end, and a dark area at its upper margin and in juxtaposition to the caudal

FIGURE 122.—*Bembrops gobioides*: *a*, dorsal aspect of head; *b*, ventral aspect of head; mandible more extensively scaled than shown in figure. (Both from Goode and Bean.)

peduncle, the latter probably representing a transformation of the juvenile caudal spot; pectoral usually more or less dusky all over and with a dark, transverse, curved band at its base; pelvic nearly pigmentless basally, dusky distally.

SPECIMENS EXAMINED: Tortugas, collected by Longley (USNM 92040). Collected by the *Oregon* and the *Albatross* in 65–280 fathoms off the following localities: Cape San Blas, Fla. (USNM 45744, 45975, 45973, 157727). Pensacola, Fla. (USNM 157726). Mississippi Delta (USNM 44233, 157728–30). Corpus Christi Pass, Tex. (USNM 157731–2). The preceding 12 lots comprise 50 specimens 81–220 mm. in standard length, approximately 95–260 mm. The foregoing account of the species is based chiefly on these specimens from southern Florida and the northern coast of the Gulf of Mexico. The single small specimen (26007) on which the species was originally based had been taken farther north as follows: *Fish Hawk* Sta. 871, lat. 40°02′54″ N., long. 70°23′40″ W., off Long Island, N. Y., 115 fathoms, Sept. 4, 1880. This holotype, about 43.5 mm. in standard length, the caudal damaged, is now in bad condition and altogether faded. The number of pectoral rays and scales are not definitely determinable. Other counts are as follows: D VI; 17. A 18. GR 5+15. Judged by these determinable counts it is apparently conspecific with the 50 southern specimens listed above; but it is of course necessary to examine a well preserved sample from the type locality to be certain of this identification.

COMPARISON: This species averages the highest fin ray and scale counts. It is nearest *anatirostris* and the differences between them are discussed under that species (p. 637).

References

GILBERT, CHARLES HENRY

1905. The deep-sea fishes of the Hawaiian Islands, *in* Jordan and Evermann, The aquatic resources of the Hawaiian Islands. Bull. U. S. Fish Comm., vol. 23, pt. 2, pp. 575–713+xi, figs. 230–286, pls. 66–106.

JORDAN, DAVID STARR

1923. A classification of fishes, including families and genera as far as known. Stanford Univ. Publ. (Biol. Sci.), vol. 3, No. 2, pp. 79–243+x.

MIRANDA RIBEIRO, ALIPIO DE

1915. Peixes. *In* Fauna Brasiliense (Arch. Mus. Nac. Rio de Janeiro), vol. 17, Percophidae.

1918. Peixes. *In* Fauna Brasiliense (Arch. Mus. Nac. Rio de Janeiro), vol. 21, 227 pp. [Bibliography for vol. 17, ibid., omitted in that volume.]

REGAN, C. TATE

1913. The classification of percoid fishes. Ann. Mag. Nat. Hist., ser. 8, vol. 12, pp. 111–145.

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